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(21)	(A1)	2,163,311
(22)		1995/11/20
(43)		1997/05/21

(51) Int.Cl. <sup>6</sup> G01S 13/74; G01S 13/75

(19) (CA) **APPLICATION FOR CANADIAN PATENT** (12)

(54) Passive Transponder Identification Apparatus

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Isted, Robert Edward - Canada ;

(71) Same as inventor

(57) 2 Claims

Notice: This application is as filed and may therefore contain an incomplete specification.



Industrie Canada Industry Canada

OPIC - CIPO 191

Canada

**ABSTRACT OF THE DISCLOSURE**

A passive transponder identification apparatus which includes a plurality of transponders, a microprocessor and a single reader/transmitter coupled to the microprocessor. A plurality of antennas are provided with each antenna being coupled via a signal relay with the microprocessor. Each one of the plurality of antennas is dedicated to one of the plurality of transponders. The microprocessor sequentially activates each one of the plurality of antennas to send a signal from the single reader/transmitter. An exchange of signals with each one of the plurality of transponders occurs during the activating sequence when the one antenna dedicated to that one transponder is activated.

**TITLE OF THE INVENTION:**

passive transponder identification apparatus

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**NAMES OF INVENTORS:**

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**FIELD OF THE INVENTION**

The present invention relates to a passive transponder  
15 identification apparatus and, in particular, one that is  
capable of being used with multiple transponders.

**BACKGROUND OF THE INVENTION**

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Over the past twenty years passive radio frequency  
identification has been used to automatically identify objects.  
One example, of a practical application of this technology is  
in monitoring the feeding, drinking, and sleeping habits of  
25 animals. The basic elements of such systems include a  
reader/transmitter, an antenna and a transponder. The  
reader/transmitter sends an electromagnetic charge wave through  
the antenna to the transponder, which uses this energy to  
transmit a radio frequency signal back through the antenna to  
30 the reader/transmitter. Typically, the signal includes an  
identification code unique to each transponder. In order to  
monitor the activities of large herds or confined groupings of  
animals, one must be able to monitor multiple transponders in  
a relatively small area. With currently available technology  
35 it is impossible to read multiple transponders using one  
reader/transmitter. Each one of the multiple transponders uses  
the same frequency to transmit its unique identification code

back to the reader/transmitter, a single reader/transmitter is  
unable to decipher each individual identification code. In  
order to make systems with multiple transponders operational,  
multiple reader/transmitters are required, which makes such  
5 systems costly.

#### SUMMARY OF THE INVENTION

10 What is required is a passive transponder identification  
apparatus that is capable of reading multiple transponders.

According to the present invention there is provided a  
passive transponder identification apparatus which includes a  
15 plurality of transponders, a microprocessor and a single  
reader/transmitter coupled to the microprocessor. A plurality  
of antennas are provided with each antenna being coupled via  
a signal relay circuit with both the microprocessor and the  
reader/transmitter. Each one of the plurality of antennas is  
20 dedicated to one of the plurality of transponders. The  
microprocessor sequentially activates each one of the plurality  
of antennas via the signal relay circuit to send a signal from  
the single reader/transmitter. An exchange of signals with  
each one of the plurality of transponders occurs during the  
25 activating sequence when the one antenna dedicated to that one  
transponder is activated.

#### BRIEF DESCRIPTION OF THE DRAWINGS

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These and other features of the invention will become more  
apparent from the following description in which reference is  
made to the appended drawings, wherein:

FIGURE 1 is a schematic diagram of a passive transponder  
35 identification apparatus constructed in accordance with the  
teachings of the present invention.

**DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT**

The preferred embodiment, a passive transponder identification apparatus generally identified by reference  
5 numeral 10, will now be described with reference to **FIGURE 1**.

Passive transponder identification apparatus 10 includes a plurality of transponders 12, a microprocessor 14, a single reader/transmitter 16 and a plurality of antennas 18. Each  
10 transponder 12 is secured to or implanted in an individual animal (not shown). The remaining portion of passive transponder identification apparatus 10 is positioned at a monitoring station. Reader/transmitter 16 is coupled to microprocessor 14. Each of antennas 18 are coupled via a  
15 signal relay circuit 20 with both microprocessor 14 and reader/transmitter 16. Each one of the plurality of antennas 18 is dedicated to one of the plurality of transponders 12. Microprocessor sequentially activates each one of the plurality of antennas 18 via signal relay circuit 20 to send a signal  
20 from the single reader/transmitter 16 and receive a return signal from one of the transponders 12. An exchange of signals with each one of the plurality of transponders 12 occurs during the activating sequence when the one antenna 18 dedicated to that one transponder 12 is activated. With the passive  
25 transponder identification apparatus, as described, eighty or more transponders can be accommodated.

The best mode of the invention will now be described. In order to optimize reading distance attention it is preferred  
30 that each antenna 18 be wound such that the induction/capacitance introduced still allows for optimum resonance. It is also preferred that a minimum of capacitance and inductance be introduced into signal relay circuit 20. Preferably the circuit measures inductance and introduces the  
35 appropriate amount of capacitance. In order to reduce inductance, it is preferred that the traces be kept as parallel as possible. In order to reduce resistance, it is preferred

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2. A method of having a single reader/transmitter read a plurality of passive transponders, comprising the steps of:  
coupling the single reader/transmitter to a  
5 microprocessor;  
connecting a plurality of antennas via a signal relay circuit with both the microprocessor and the single reader/transmitter, each one of the plurality of antennas being dedicated to one of a plurality of transponders, the  
10 microprocessor sequentially activating each one of the plurality of antennas via the signal relay circuit to send a signal from the single reader/transmitter such that an exchange of signals with each one of the plurality of transponders occurs during the activating sequence when the one antenna  
15 dedicated to that one transponder is activated.



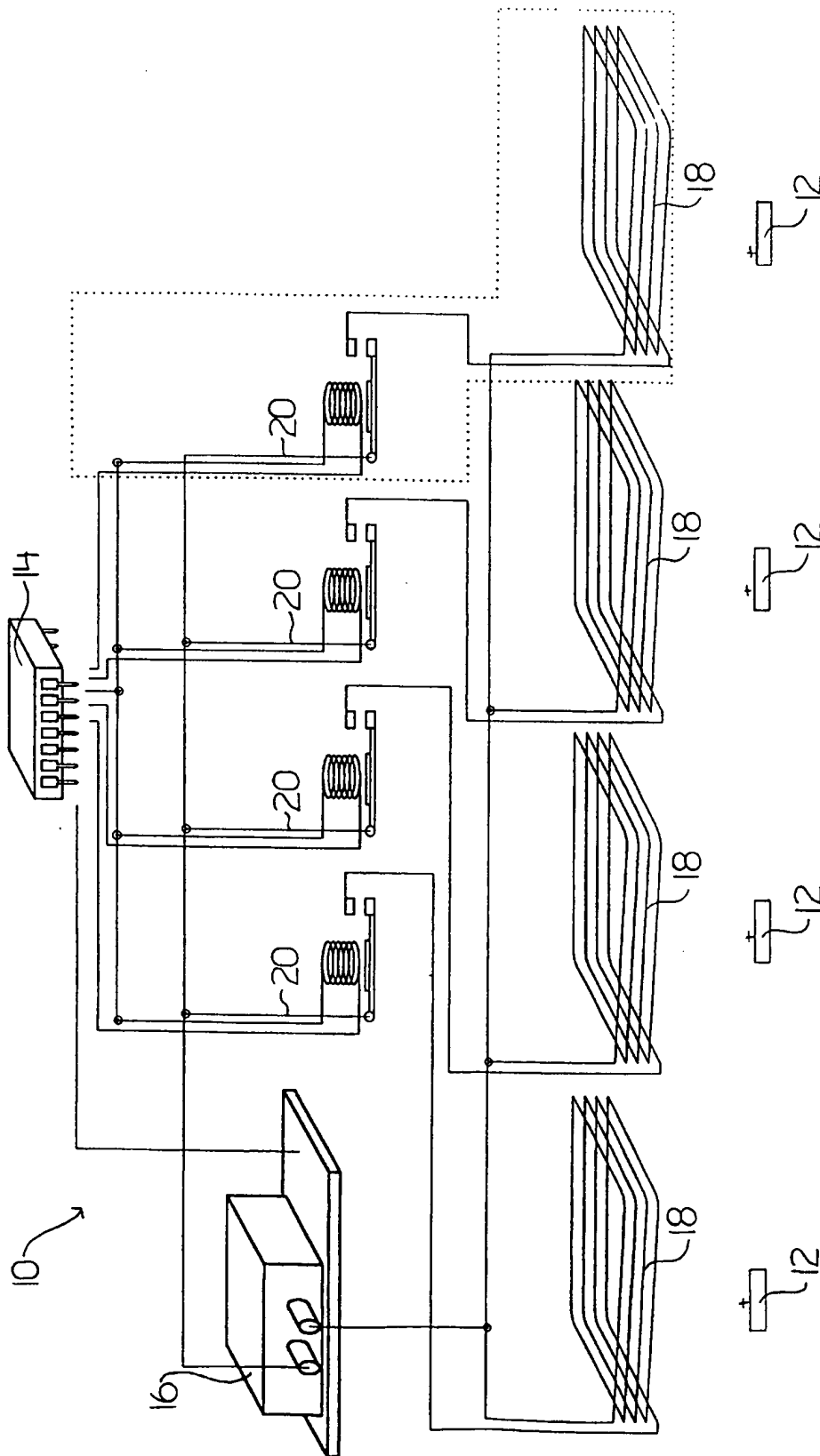


FIGURE 1